

Graupner

Assembly instructions for the MEGA DRAGSTAR III model boat, Order No. 2054

The model

The MEGA DRAGSTAR III is the improved competition version of the MEGA DRAGSTAR II. The model has been developed with emphasis on its potential in the MONO 2 contest classes as well as the new S 14 standard racing class. An integral bonded-in flood duct enables the model to right itself automatically and resume running after turning over. This is particularly important for competition work, as the race is over if the boat cannot continue. The strong, lightweight construction of the GRP hull and hatch cover makes the model well suited to the rough and tumble of competition work. For optimum performance an optional aluminium rudder system is available under Order No. 2362.

The new S 14 standard racing class has been introduced in order to provide an easy, low-cost first step into the contest world for the marine modeller. The rules require kit models, drive batteries consisting of up to fourteen cells, SPEED 700 motors and other details. For more information and the current rules regarding the MONO 2 and S 14 racing classes please visit the Internet sites www.nauticus-sport.info, www.naviga.org or www.eco-ide.de. These sites also include a list of future racing events.

Specification

Length approx.	672 mm
Overall length approx.	780 mm
Beam approx.	180 mm
All-up weight incl. RC approx.	1900 to 2000 g

Important safety notes

You have purchased a kit which can be assembled to produce a fully working RC model when fitted out with the appropriate accessories. As manufacturers, we at GRAUPNER are not in a position to influence the way you install, operate and maintain the model, nor the other components used in connection with the model.

For this reason we are obliged to deny all liability for loss, damage or costs which are incurred due to the incompetent or incorrect use and operation of our products, or which are connected with such operation in any way. Unless otherwise prescribed by binding law, the obligation of the GRAUPNER company to pay compensation, regardless of the legal argument employed, is excluded. This includes personal injury, death, damage to buildings, loss of trade or turnover, interruption of business or other indirect or direct damages which are caused by the operation of the model.

Under all circumstances and in all cases the company's overall liability is limited to the amount which you actually paid for this model.

The model is operated at the sole risk of the operator. To avoid injury to persons and damage to property please handle your model boat carefully and operate it conscientiously at all times.

Before you run the boat for the first time it is important to check that your private third party insurance policy provides cover when you are operating model boats of this kind. If you

are not sure, take out a special insurance policy designed to cover the risks of RC modelling.

These safety notes are important, and must be kept in a safe place. If you ever dispose of the model, be sure to pass them on to the new owner.

Guarantee conditions

The guarantee covers replacement of any parts which can be shown to exhibit manufacturing faults or material defects within the guarantee period of 24 months from the initial date of purchase. No other claims will be considered. Cost of transport, packing and freight are payable by the purchaser. We accept no liability for damage in transit. When you send the product to GRAUPNER, or to the approved Service Centre for your country, you must include a clear and concise description of the fault together with the invoice showing the date of purchase. The guarantee is invalid if the component or model fails due to an accident, incompetent handling or incorrect usage.

GRAUPNER GmbH & Co. KG

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GERMANY

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The following points are important and must be observed at all times:

- This model is not suitable for young persons under 14 years of age.
- This is a high-speed model, which means that you must **NEVER** operate it when there are persons or animals in the water, otherwise there is a serious risk of causing injury.
- Check whether there are any persons on the bank. If you make a mistake controlling your model, or if a fault occurs, the boat could strike the bank at high speed, slide up onto the ground and cause injury. Please make sure any onlookers are aware of the danger, and ask them to leave the hazard zone.
- Never run your boat in a protected site, an animal or plant sanctuary or a site of special scientific interest (SSSI). Check with your local authority that the stretch of water you wish to use is suitable for model boats.
- Do not run the model in salt water.
- Never run your boat in adverse conditions, e.g. rain, storm, strong wind, choppy water or strong currents.
- Before you run the model check that the radio control system is working reliably, and that all connections are secure.
- If you are using dry cells as a power supply, please note that these must never be recharged. Only batteries marked specifically as "rechargeable" can safely be recharged.
- It is important to charge the batteries before each session, and to check the range of the radio control system. The transmitter and receiver batteries in particular must be fully charged at the start of each run.
- Ensure that the channel you intend to use is not already in use by other modellers. Never run the boat if you are not certain that your channel is free.

- Read and observe the recommendations and instructions supplied with your radio control system and accessories.
- Do not work on the power system unless the motor is disconnected from the drive battery.
- When the drive battery is connected, keep well clear of the area around the propeller, as this represents the greatest risk of accident and injury. Make sure any spectators do the same.
- Do not exceed the recommended voltage of the drive battery. Increasing the voltage may cause the motor and / or the speed controller to overheat, and the electrical leads can even melt. In the worst case this may cause the model to go up in flames and be completely ruined.
- Check that all the drive train components work smoothly and freely. This applies in particular when you are running the model, as leaves and other detritus can get caught up in the power train. If this happens and you do not remove the obstruction, the motor, speed controller or rudder servo may be ruined due to overloading.
- Ensure that the servos are not mechanically obstructed at any point in their travel.
- Dry cells and rechargeable batteries must never be short-circuited. Do not allow them to come into direct contact with water.
- Allow the drive motor and speed controller to cool down after each run. Don't touch the hot surfaces!
- Remove all batteries from the model prior to transporting and storing it.
- Do not subject the model to high levels of humidity, heat, cold, vibration or dirt.
- Secure the model, batteries and RC equipment carefully when transporting them. They may be seriously damaged if they are free to slide about.
- If you wish to operate the model on moving water (e.g. a river), remember that it could be washed away downstream if the battery fails or a malfunction occurs.
- If you have to **salvage** the model, take care **not to risk your own life or that of others**.
- Check regularly that the hull is completely watertight, as the model may sink if too much water enters the hull. Check the boat for damage before every run, and ensure that water cannot penetrate the hull through the shaft or rudder openings.
- Take care to seal the model before every run, so that water cannot enter. Before running the boat, **ALWAYS** seal the hatch cover completely by applying tape all round.

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Care and maintenance

- Clean the model carefully after every run, and remove any water which penetrates the hull. If water gets into any of the RC components, dry them out and send them to your nearest GRAUPNER Service Centre for checking.
- Clean the model and RC components using suitable cleaning agents only. Ask your model shop for information.
- Lubricate the propeller shaft at regular intervals.
- If the model is not to be operated for a considerable time, it is important to dismantle all the moving parts (propeller shaft etc.), and clean and re-lubricate them.

Notes on building the model

- Before you start building the boat it is important to study the plan and read right through the instructions, referring to the parts list constantly. In general terms the instructions and parts list reflect the sequence of assembly.
- Please bear in mind that many tools can be dangerous if misused or handled carelessly.
- The electric motor must be suppressed by fitting a 470 nF capacitor (Order No. 3588). Solder the capacitor across the motor terminals to form a bridge. If you are using a BRUSHLESS or SENSORLESS motor this is not necessary, as suitable suppression measures are built-in as standard.
 - Deploy all electrical cables neatly, without crossing them over. Take great care to avoid any bare positive wire touching any negative wire.
 - Be sure to use cable which is capable of carrying the high currents which flow when the boat is operating.
 - Deploy the receiver aerial as far away as possible from any high-current cables (at least 3 cm).
 - We do not recommend the use of standard-sized servos, as they are too large for the model (you may not be able to position the drive battery correctly). If you only have standard servos, you may have to re-position the battery as best you can.
 - The shaft system must be lubricated; be sure to use a type of grease or oil which does not soil or contaminate water (e.g. Order No. 570).
 - If you have any intention of entering the boat in official competitions, you must fit the prescribed emergency cut-off switch and a method of holding race number placards (Order No. 365). These parts are not included in the kit. Please visit the Internet sites already mentioned for more information and details of the regulations.
 - Please take particular care when driving screws into GRP parts. If you over-tighten the screws, the GRP material may tear and the threads strip. If this should occur, apply thick cyano to the hole until it is completely sealed, then fit the screw into the hardened adhesive again, without drilling out the hole. This procedure can be repeated as often as required. The model is reinforced with a plywood plate in the rudder area.
 - Before gluing parts together, it is important to clean the joint surfaces carefully. This is best done by sanding lightly, followed by wiping with a non-greasy liquid detergent or methylated spirit ("meths"). The same applies to all surfaces which are to be painted, as this improves the paint's adhesion considerably. Before gluing any part to the hull it is essential to roughen the surface carefully using fine abrasive paper, and de-grease it thoroughly using a solvent such as acetone. This applies in particular to GRP hulls. If you neglect this, you cannot expect the glued joints to "hold" in the long-term.

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- Recommended adhesives for joining particular materials:

Material - material
Metal - metal

Suitable adhesives
Cyano-acrylate, UHU plus

GRP - wood	Thick cyano-acrylate, UHU plus
GRP - GRP	Cyano-acrylate, UHU plus
GRP - metal	Cyano-acrylate, UHU plus
GRP - plastic (resin air cowls)	Cyano-acrylate
Wood - wood	Cyano-acrylate, UHU hart, white glue

Read the instructions supplied with the adhesives. Be sure to observe any special notes in the instructions regarding particular adhesives. If you are using acetone, methylated spirits or any other solvent as a cleaning agent, special safety measures are necessary. Read the instructions supplied with these materials.

Assembly instructions

1. Assemble the boatstand from the two side panels (part 1), the front hull support (part 2) and the rear hull support (part 3); glue the parts together securely. **TIP:** the support surfaces for the hull can be lined with soft felt or similar material to avoid scratching the hull surface.
2. Glue the reinforcing plate (part 4) to the inside of the transom (hull - part 6) You may need to sand back the edges slightly to allow the plate to make good contact with the transom.
3. Mark the position of the holes on the stern, and drill 1.5 mm Ø pilot-holes at the marked points. If you use a larger size of drill, the screws will not hold securely.
4. The opening for the stern tube should be drilled out cautiously, otherwise the edges of the hole will tend to tear. Start by drilling out the hole using progressively larger bits, then use a round file to open it up to the final diameter of 10 mm.
5. The next step is to assemble the power assembly: locate the motor mount (part 7) and shorten it on the side with the tall struts, as shown on the plan. Screw the electric motor to the motor mount using the M3 x 8 mm or M4 x 8 mm screws supplied, according to the motor you are using. Screw the shaft coupling (part 8) to the motor shaft. Screw the shaft coupling (part 10) to the propeller shaft and stern tube (part 11), but only tighten it lightly; just ensure that the coupling does not fall off. The flex-shaft (part 9) is fitted between the two shaft couplings. **NOTE:** please bear in mind that the shafts of the suggested motors are of different lengths, so allowance must be made for your particular hardware when installing the power system. If you subsequently wish to change to a different motor type, you may need to shorten the flex-shaft (part 9) or place washers between the motor and the motor mount. If the shaft of the new motor is shorter than the previous one, you will need to install a longer shaft coupling.
6. Fix the bracket (part 12) to the stern tube. Glue the bracket to the base (part 13) permanently, then place the power system in the hull "dry" (no glue), and trim the base to fit the bottom of the hull.
Set the power assembly perfectly straight in the hull. Fit the propeller (part 14) on the shaft. If you now lay a ruler across the bottom edge of the forward step and the edge of the second step, the hub of the propeller should be located above the ruler, i.e. when the model is running across the water, the propeller hub should be above the waterline. The position of the ruler is indicated as a line on the plan. When you have established the correct position, tack the stern tube and the motor mount to the hull using a little cyano.
7. When the cyano has set hard, apply a fillet of UHU plus (epoxy) round the stern tube in the area of the transom for greater strength. **TIP:** it is a good idea to thicken the epoxy with a filler such as chopped cotton strands or glass micro-balloons; this will prevent it running out of the joint, and will provide a stronger joint between the stern tube and the hull. **NOTE:** for the competition version you should glue a patch of glass

fibre cloth over the stern tube and the hull to ensure that the tube cannot come adrift. A patch of fabric cloth can also be used if you have no glass cloth to hand.

8. The openings for the flood duct can now be cut out as shown in the drawing. If you are an experienced marine modeller, you do not need to keep to the shapes shown; you can cut them to the exact position and shape you wish; the only requirement is that sufficient water can enter and air escape through them, to ensure that the flood duct works correctly. The openings at the stern must be as large as possible, as the water runs out through them when the boat is running. **TIP:** a good method of cutting the openings accurately is to drill holes at all the corners, then file out the straight lines between the holes using a round needle file. An alternative is to drill a line of holes close together, and cut through the unwanted material between them. All the corners of the openings should be rounded, as sharp corners form “stress raisers” at which the hull might subsequently crack.

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9. Fill the whole of the flood duct with water through the opening, and check that the duct is completely sealed from the hull: it must not be possible for water to enter the hull through the flood duct. If you find a hole, plug it with UHU plus.
10. Drill a 6 mm Ø hole for the sealing tube (part 19) in the position shown on the plan. Drill seven 1.5 mm Ø holes for the rudder system (part 15) and the turn fin (part 21) in the stern of the hull. Fit the rubber bellows (part 18) on the sealing tube and glue the bellows in the 6 mm Ø hole using cyano.
11. Attach the rudder system (part 15) to the stern using four retaining screws. Fit a pushrod connector (part 16) on the underside of the tiller and secure it with an M2 plastic nut fitted on the top.
12. Remove the lug between the screw mountings (see plan) so that the rudder servo fits in the two-part servo mount (part 20).
Attach the servo to the mount (part 20), and fix the mount to the servo base (part 5) using four 2.2 Ø x 6.5 mm self-tapping screws. Fix the servo in place using two more 2.2 Ø x 6.5 mm self-tapping screws and two 2.8 / 7.0 Ø washers; make sure the servo cannot shift.
13. Mount a pushrod connector (part 16) on the servo output arm and secure it with an M2 plastic nut. Slip the steering pushrod (part 19) through the rubber bellows from the rear, and connect it to the pushrod connectors. In this position the servo base (part 5) can be glued to the hull floor using cyano. **TIP:** check that this joint is really secure.
14. Fix the turn fin (part 21) to the stern using three retaining screws, as shown on the plan.
15. The rest of the RC system components can now be installed in the model; they should be attached using Velcro (hook-and-loop) tape. The same material is also used to secure the drive batteries. **NOTE:** each battery should be secured using as long a strip of tape (approx. 10 cm) as possible, otherwise they may come loose if the boat turns over; in this case the altered Centre of Gravity might prevent the flood duct working properly.
16. The aerial (part 22) can now be mounted on the model: drill a 2.5 mm Ø hole in a suitable position (i.e. as far away as possible from the high-current motor leads). Bend the steel whip aerial to the shape shown on the plan and fix it to the model using the

M2.5 screw and nut. **TIP:** to ensure that water cannot get inside the hull through the screw-hole, apply UHU alleskleber (clear general-purpose adhesive) to the screw before fitting it. **NOTE:** it is important not to alter the standard length of the receiver aerial, i.e. if the steel whip aerial is, say, 30 cm long, the flexible aerial must be shortened by the same amount.

17. The model can now be painted in the colour scheme of your choice, if you don't wish to copy the scheme shown in the kit box illustration. Allow the paint to dry out thoroughly before applying the decals: cut out the decals as accurately as you can, using a sharp pair of scissors, and apply them to the boat in the arrangement shown on the kit box. **TIP:** to help you apply the cockpit decal to the hatch cover (part 23), place it in position with the backing film still attached, and mark the corners with a pencil. Now remove the backing film and apply it; the markings will help you position the cockpit decal correctly aligned.
18. Test the model's functions in turn. **IMPORTANT:** make sure there is nothing in the vicinity of the propeller or other moving parts before you do this. Assemble the model completely, ready to run, with the hatch sealed but the system not switched on. Invert the boat and place it in water (e.g. the bathtub), to check the operation of the flood duct: the model should right itself very rapidly. If this does not happen, you need to move more weight outwards to the side of the flood duct, e.g. by re-positioning the drive batteries.

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Water-cooling system

Our tests have shown that a water-cooling system is not strictly necessary if you use the recommended power train and build the model exactly as described; this applies to the Sport and S 14 power variants. If you wish to use a water-cooling system, install it using your favoured method. **NOTE:** the motor mount supplied in the kit cannot be used for this, as there is no space for a water-cooling jacket between the motor and the mount if you are using a SPEED 700 motor. We do advise the installation of a water-cooling system for the MONO 2 power variants; if you are using the motor, Order No. 6534, it is possible to use the water-cooling coil, Order No. 3324. In this case there are no space problems if you use the recommended motors.

Painting

- We suggest that you ask your local model shop or a specialist paint dealer for recommended paint types. As a basic rule we advise that you use the Graupner range of colour paints, as these have been tested on a very wide range of surfaces.
- Be sure to use **ONLY** paints of the same type and make, otherwise they might react with each other, either dissolving the earlier coat, or causing unsightly bubbling. Be particularly careful when combining spray can paints with types designed for brush application; always check on some scrap material that the paints are compatible with each other.
- To obtain good paint adhesion, sand the surfaces lightly beforehand using fine wet-and-dry paper (600-grit to 800-grit). Remove all traces of grease from the surfaces using a non-greasy liquid detergent or meths. Try not to touch the cleaned surfaces

again before you paint them, as the perspiration in your skin also contains grease which will soil the surface once more.

- The wooden parts must be sealed to prevent them absorbing water. Use sanding sealer (e.g. GLATTFIX, Order No. 207) or clear lacquer (e.g. HYDRO-AEROFIX, Order No. 926.1) for this.
- If you are using spray paints, carefully mask off all areas which are not to be painted. Seal all holes too, as the fine mist of paint penetrates every opening, no matter how small.
- Read and observe the instructions supplied by the paint manufacturer.

Colour scheme

We recommend Graupner ACRYLFIX spray cans for the colour finish:

Hull, hatch cover	Order No. 929.4, yellow
Hull contrast areas	Order No. 930.7, matt black

Maiden run

Charge the batteries fully and test the model's working systems one by one. Seal the hatch cover with adhesive tape, so that there is no chance of water penetrating the hull. You are now ready for the boat's maiden run. Take your time to get used to the model's handling characteristics. Please bear in mind that this boat is capable of very high speeds, and is therefore not as easy to control as a slower vessel.

Important: when you wish to turn the boat, reduce the throttle (to around half-speed) just before initiating the turn, otherwise the model may flip over or turn on the spot. We recommend that you only use full-throttle on the straights.

We hope you have loads of fun building and running your MEGA DRAGSTAR III.

Notes on trimming a Mono racing boat

Model racing boats require careful trimming to ensure that they run with maximum efficiency. The following points should be checked and fine-tuned in order to obtain a smooth-running racing boat:

- **Centre of Gravity:** the Centre of Gravity (CG) marked on the plan is a good starting point, and will provide safe handling for the first few runs. If you find that the stern of the boat tends to jump, the CG should be moved further aft by re-positioning the drive batteries. If the model tends to take off, move the CG further forward. Make any changes in small increments until you find the optimum position. The correct CG will also alter slightly according to the state of the water surface (waves or smooth water).

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- **Position of the drive batteries:** the batteries should be installed as close as possible to the stern tube in order to counteract any tendency for the boat to "dutch-roll" (rock around the fore-and-aft axis). It is also important that the model should be slightly

heavier on the left-hand (port) side than on the right-hand (starboard) side, as seen from the stern, as this improves the action of the flood duct.

- **Position of the propeller:** the propeller should be positioned in such a way that the bottom edge of the shaft (propeller hub) is above the surface of the water when the model is at speed, as this reduces water friction.
- **Step edges:** all the steps in the hull which are at right-angles to the direction of running should be as sharp as possible. The steps reduce the boat's water resistance (drag) when at speed, and therefore the model's running time varies according to the shape of the edges. Sharp steps also improve the boat's starting characteristics.
- **All-up weight:** since racing boats spend more time flying over the water than slicing through it, it is important to keep their all-up weight as low as possible. For this reason only lightweight components should be used, and adhesives should be used sparingly (but do use sufficient for strong joints!). Apply the painted finish thinly.
- **Propeller size:** with racing boats it has proved advantageous to use high-revving motors and fairly small propellers, as this combination has the least effect on the boat's handling (straight-running characteristics), although it does prolong the acceleration phase. The 42 mm diameter propeller supplied in the set is well suited to the Sport, S 14 and MONO 2 power variants. A "K"-series propeller of 43.5 mm Ø (Order No. 2318.43) is more suitable for the MONO 2 Brushless version. The optimum size can only be found through practical testing, as it varies according to the capacity and quality of the drive battery, the condition of the motor, the model's all-up weight, its weight distribution, the "chop" of the water, etc.

Parts List

Part	Description	No. off	Material	Dimensions in mm
1	Boatstand side panel	2	Plywood	4.0, laser-cut
2	Front hull support	1	Plywood	4.0, laser-cut
3	Rear hull support	1	Plywood	4.0, laser-cut
4	Stern reinforcement	1	Plywood	4.0, laser-cut
5	Servo base	1	Plywood	4.0, laser-cut
6	Hull	1	GRP	Ready made
7	Motor mount	1	Plastic	Ready made, 1157.2
8	Shaft coupling	1	Aluminium	Ready made, 3374
9	Flex-shaft	1	Steel	Ready made, 3379.1
10	Shaft coupling	1	Aluminium	Ready made, 3382
11	Stern tube and shaft	1	Aluminium / steel	Ready made, 1981.3
12	Bracket	1	Plastic	Ready made, 2317.42
13	Base	1	Plywood	4.0, laser-cut
14	Propeller	1	Plastic	Ready made, 2317.42
15	Rudder system	1	Plastic	Ready made, 2363
16	Pushrod connector	2	Plated brass	Ready made, 1173
17	Sealing tube	1	Aluminium	6.0 / 5.0 x 10 mm
18	Rubber bellows	1	Rubber	Ready made, 3356
19	Steering pushrod	1	Stainless steel	1.5 Ø x 150 mm
20	Servo mount	1	Plastic	Ready made, 3893.20
21	Turn fin	1	Plastic	Ready made, 3893.20
22	Whip aerial	1	Steel wire	0.6 Ø x 330 mm
23	Hatch cover	1	GRP	Ready made

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The following parts are also required

(included in the kit):

2	M4 x 8.0 mm socket-head cap screws:	motor mounting
2	M3 x 8.0 mm socket-head cap screws:	motor mounting
4	2.9 Ø x 9.5 mm self-tapping screws:	rudder mounting
4	2.2 Ø x 6.5 mm self-tapping screws:	servo mount
2	2.2 Ø x 6.5 mm self-tapping screws:	servo mounting
3	2.2 Ø x 6.5 mm self-tapping screws:	turn fin mounting
2	2.2 Ø x 6.5 mm self-tapping screws:	bracket mounting
8	Grubscrews:	shaft coupling
2	Grubscrews:	pushrod connectors
2	Plastic nuts:	pushrod connectors
1	M2.5 x 10 mm screw	aerial mounting
1	M2.5 nut:	aerial mounting
4	2.8 Ø x 7.0 Ø washer:	aerial mounting
2	2.8 Ø x 7.0 Ø washers:	servo mounting
1	Velcro tape, 25 cm:	battery, receiver and speed controller mounting
1	Decal sheet	

The following parts are also required

(not included in the kit)

1	C 3041 servo, Order No. 3899; or a similar servo of the same case size
1	Motor (see table below)
1	Electronic speed controller (see table)
2	Drive batteries, each 4, 6 or 8 cells (see table)
1	Battery link cable, Order No. 3031
1	MX-12 radio control set, Order No. 4723, or other Graupner / JR 40 MHz computer radio control system

Motor and accessories

Racing class	Electric motor Order No.	Drive battery Order No.	Speed controller Order No.
Sport 4 + 8 = 12 cells	SPEED 700 BB TURBO C 9.6 V 7307	ECO-POWER 8-NiMH 9.6 V / 3.3 Ah 2596.8 ECO-POWER 4-NiMH 4.8 V / 3.3 Ah 2596.4	POWER V60 2847
S-14 6 + 8 = 14 cells	SPEED 700 BB 600 M 12 V 6534	GMVIS GP 8N-3700 NiMH 9.6 V / 3.7 Ah 2491.8 GMVIS GP 6N-3700 NiMH 7.2 V / 3.7 Ah 2491.6	POWER V60 2847
MONO-2 4 + 8 = 12 cells	GRAUPNER INLINE 600 M 12 V	GMVIS GP 8N-3700 NiMH 9.6 V / 3.7 Ah 2491.8	GRAUPNER GENIUS 70 2897

	6534	GMVIS GP 4N-3700 NiMH 4.8 V / 3.7 Ah 2491.4	
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